Message

From: Beeler, Cindy [Beeler.Cindy@epa.gov]
Sent: 12/14/2018 4:14:45 PM
To: McCoy, Melissa [mccoy.melissa@epa.gov]
CC: Strobel, Philip [Strobel.Philip@epa.gov]
Subject: Fw: Uinta Basin Aerial (and Ground-based) IR Survey Project - Final Report
Attachments: UB_IRSurveyReport_Nov2018.pdf

Melissa - Phil passed along your comment from reading the report. If you'd like to meet to discuss that would help me better understand what you were getting at …

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From: Beeler, Cindy
Sent: Tuesday, December 4, 2018 4:15 PM
To: Garvey, Megan; Patefield, Scott; Monica Morales; Hestmark, Martin; Daly, Carl; Strobel, Philip
Cc: Gregory, Kate
Subject: Uinta Basin Aerial (and Ground-based) IR Survey Project - Final Report

It was seed money from EPA OECA-AED that enabled EPA R8 to leverage collaboration and additional funds from our federal partner, BLM, and state partner, UDAQ, to conduct the helicopter IR survey of thousands of oil & gas wells in the Uinta Basin ($25k from EPA, $30k from UDAQ and $90k from BLM). Utah State University (our PM on the project) also brought money to the table to conduct ground-based IR surveys at hundreds of pads.

As you may recall, the project was delayed considerably as we sought Ute Tribe approval to fly over the reservation. Once approved through Tribal Resolution, we had a very small remaining window of time to spend the money so the flyover occurred in late Feb/early March.

BIG lesson learned from this work was cold ambient temperatures particularly impact the ability of OGI to detect hydrocarbon emissions against a cold ground background temperature.

Another lesson further supported, was that most of the emissions observed come from controlled tanks.

Observed emissions from both the aerial and ground surveys were reported to operators, some of whom then reported back on cause of leak and how/if it was repaired along with some cost data.

Executive Summary

We used FLIR GF320 infrared optical gas imaging cameras to detect hydrocarbon emissions from oil and natural gas wells in Utah's Uinta Basin. The purposes of this study were to (1) better understand the sources of hydrocarbons from the oil and gas industry and (2) investigate different emissions detection approaches. We

surveyed 3,428 oil and gas facilities (including 3,225 producing oil and gas wells) from a helicopter in February and March 2018, including well pads, compressor stations, and gas plants (though emissions were only observed from well pads). We also surveyed from the ground 419 of the same well pads that were part of the helicopter survey.

This study was funded by the Bureau of Land Management, the Utah Legislature, the Utah Division of Air Quality, and the U.S. Environmental Protection Agency. A steering committee consisting of representatives from the Ute Indian Tribe, the Bureau of Land Management, the Utah Division of Air Quality, and the U.S. Environmental Protection Agency worked with our research team to plan the study and guide its execution. The study's major conclusions include:

- Cold temperatures lead to poor contrast between emission plumes and the ground, reducing the detectable emission rate of infrared optical gas imaging cameras used from aerial platforms. The aerial portion of this study detected less than 1/10th the number of emission plumes that were observed in a similar study performed during summer months and had a detection limit that was between 2.5 and 7 times worse.

- Ground-based infrared camera surveys can detect much smaller emissions than aerial surveys. During the ground survey, we detected emissions at 31% of well pads, compared to 0.5% of pads during the aerial survey, and the detection limit for our camera, when used from the ground, was at least ten times better than when the camera was used from the helicopter. The reason for the difference was apparently largely because the camera's high sensitivity mode cannot be used effectively from the moving helicopter platform.

- Well pads with detected emissions during the ground and aerial surveys had higher oil and gas production, were younger, were more likely to be oil wells (aerial survey only), and had more liquid storage tanks per pad relative to the entire surveyed population.

- The majority of observed emission plumes were from liquid storage tanks (75.9% of all observed plumes), including emissions from pressure relief devices like pressure relief valves and thief hatches on the tank or from piping that connects to the tank.

- Well pads with control devices (combustors or vapor recovery units) to reduce emissions from tanks were more likely to have detected emissions, had more detected emissions per pad and were more likely to have emission plumes that were qualitatively categorized as large. Emissions from pads with tank controls originated mostly from tanks, including hatches, vents, and piping on tanks. This finding does not imply that the control devices themselves were not functioning properly. Instead, gas was escaping into the atmosphere before it reached a control device. Pads with control devices tended to be newer and have higher oil and gas production, which probably explains their higher rate of detected emissions.

Feel free to share with your teams.

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